

## SOLAR OBSERVATIONS

## SOLAR AND SKY RADIATION MEASUREMENTS DURING JULY, 1925

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For a description of instruments and exposures and an account of the method of obtaining and reducing the measurements, the reader is referred to the REVIEW for January, 1924, 52 : 42 and January, 1925, 53 : 29.

From Table 1 it is seen that solar radiation intensities averaged slightly above normal values for July at Washington, D. C., and Madison, Wis., and slightly below at Lincoln, Nebr.

Table 2 shows that the total solar and sky radiation received on a horizontal surface averaged close to the July normal at Washington, below the normal at Madison, and above the normal at Lincoln.

At Washington skylight polarization measurements made on 7 days give a mean of 43 per cent, with a maximum of 49 per cent on the 29th. At Madison, measurements made on 8 days give a mean of 58 per cent with a maximum of 64 per cent on the 10th. These are considerably below the normal values for July at Washington and slightly below at Madison.

On July 1 the radiation instruments at Washington were moved from the College of History, American University, to Temporary Building No. 2, of the Fixed Nitrogen Research Laboratory. This building is on the campus of the American University about 300 yards southwest of the College of History. The Marvin pyrheliometer is exposed in the morning outside a window facing southeast, and in the afternoon outside a window facing southwest, but the altitude above sea level is only 395 feet as compared with 418 feet in the old exposure. The horizontally exposed recording thermoelectric pyrheliometer is exposed on the roof 414 feet above sea level as compared with 451 feet at the old exposure. Also, it is shaded by the Fixed Nitrogen Research Laboratory, which is about 100 yards to the northeast, from a small section of the sky near the horizon. The polarimeter is exposed on a platform near the thermoelectric pyrheliometer.

The difference in exposures at the old and the new locations should not affect the readings of the instruments to a noticeable extent.

TABLE 1.—Solar radiation intensities during July, 1925

[Gram-calories per minute per square centimeter of normal surface]

Washington, D. C.

Date	Sun's zenith distance										Local mean solar time	
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°		
	75th mer. time	Air Mass.										
		A. M.					P. M.					
		e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.3	4.3	5.0	
July 6	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.	
13	18.59			0.52	0.73						18.59	
14	12.68		0.57								14.10	
17	12.24					1.37	1.13	0.89			9.47	
18	16.20				0.85	1.04					12.24	
23	8.48	0.82	0.91	1.04	1.20						9.14	
27	14.10	0.39	0.47	0.60	0.83	1.12					11.81	
28	14.60		0.35								14.10	
29	13.61				0.83						13.13	
29	9.47		0.80	0.92	1.13	1.37	0.86				9.14	
Means		(0.60)	0.62	0.77	0.93	1.22	(1.00)	(0.89)				
Departures		+0.02	-0.04	+0.01	+0.04	+0.05	+0.02	+0.09				

\*Extrapolated.

TABLE 1.—Solar radiation intensities during July, 1925—Continued

Madison, Wis.

Date		Sun's zenith distance										Local mean solar time	
		8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°		Noon
		75th mer. time	Air Mass.										
			A. M.					P. M.					
			e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0		5.0
July 2	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.		
9	16. 20				0. 93		1. 14				14. 10		
10	16. 79					1. 42	1. 16				17. 06		
11	13. 13				1. 21	1. 20					13. 13		
15	14. 10										21. 28		
16	19. 23				1. 07	1. 35					18. 59		
17	11. 38				1. 17						12. 08		
21	10. 59				1. 19						9. 53		
23	12. 24				1. 12	1. 28					13. 13		
28	10. 21				1. 16	1. 36					10. 59		
29	9. 14				1. 20						10. 59		
30	9. 14				1. 13						9. 47		
	10. 59					1. 31					9. 47		
Means					1. 13	1. 23 (1. 15)							
Departures					+0. 06	+0. 05	+0. 14						

Lincoln, Nebr.

July 4	12.68		0.73	0.84	1.06	1.28	1.05	0.87	0.66		10.21
6	16.20						1.08	0.85	0.70		16.20
7	16.79					1.25	1.03	0.88	0.73		17.06
8	19.23			0.90	1.08						15.05
10	17.37			0.83	1.08						19.23
11	17.96			0.91	1.07						18.59
13	17.37		0.75	0.88	1.08	1.34					16.20
14	15.11						1.10	0.94	0.79		15.05
15	18.59		0.82	0.94	1.11	1.31	1.04	0.84	0.69		16.20
16	10.59		0.92	1.05	1.19	1.41	1.16	0.99	0.84		8.18
17	9.47		0.77	0.88	0.99						7.87
18	10.97						0.89	0.72	0.57		11.81
21	10.21			0.45	0.69	1.08	0.84	0.62	0.49		9.47
23	10.21						0.94	0.77	0.62		8.51
25	15.11						0.96	0.77	0.62		15.11
Means			0.80	0.88	1.04	1.28	1.01	0.83	0.67		
Departures			+0.06	-0.04	-0.03	-0.04	-0.05	-0.05	-0.06		

TABLE 2.—Solar and sky radiation received on a horizontal surface

[Gram-calories per square centimeter of horizontal surface]

Week beginning—	Average daily radiation					Average daily departure from normal		
	Washington	Madison	Lincoln	Chicago	New York	Washington	Madison	Lincoln
July 2	cal. 475	cal. 493	cal. 617	cal. 508	cal. 428	cal. -6	cal. -44	cal. +40
9	441	565	647	482	481	-40	+35	+04
16	470	486	577	396	408	-5	-26	+8
23	520	471	505	366	423	+56	-19	-40
Excess since first of year on July 29, 1925						+959	+1,736	+896